

**What is claimed is:**

1. A process for preparing an aluminum oxide film on a substrate which comprises:
  - 5 A) bringing the vapor of a dialkylaluminum alkoxide into contact with the substrate mounted in a deposition reactor so that an aluminum-containing adsorption layer is formed on the substrate;
  - B) removing the unreacted aluminum compound and by-products from the reactor;
  - 10 C) introducing an oxygen source into the reactor so that the oxygen source reacts with the aluminum-containing adsorption layer to form an aluminum oxide layer; and
  - D) removing the unreacted oxygen source and by-products from the reactor.
- 15 2. The process of claim 1, wherein the cycle consisting of steps A) to D) is repeated until an aluminum oxide film of a desired thickness is obtained.
3. The process of claim 1, wherein the dialkylaluminum alkoxide is of the  
20 following formula:
$$R^1_2Al-O-R^2$$
wherein  $R^1$  and  $R^2$  are each independently a  $C_1$ - $C_4$  alkyl.
4. The process of claim 1, wherein the dialkylaluminum alkoxide is selected  
25 from the group consisting of dimethylaluminum isopropoxide, dimethylaluminum *tert*-butoxide, diethylaluminum isopropoxide, dimethylaluminum *sec*-butoxide and a mixture thereof.

5. The process of claim 1, wherein the substrate is silicon.
6. The process of claim 1, wherein the oxygen source is oxygen, ozone or water.
- 5 7. The process of claim 1, wherein the substrate is maintained at a temperature in the range of 100 to 300 °C.
8. The process of claim 1, wherein the dialkylaluminum alkoxide is dimethylaluminum isopropoxide and the oxygen source is water.
- 10 9. The process of claim 1, wherein the dialkylaluminum alkoxide is dimethylaluminum *sec*-butoxide and the oxygen source is water.
- 15 10. The process of claim 1, wherein each of the steps A) and C) is conducted for a period of 0.1 s or longer per cycle.
11. The process of claim 1, wherein each of the steps B) and D) is conducted by evacuating or purging with an inert gas.